

Instructor: Thomas McDonald, email: tom2@rice.edu

Office Hours: DH 2125, by appointment.

TA: Yue "Joy" Duan, yue.duan@rice.edu

Textbook: *Applied Biostatistics for the Health Sciences* by **Richard J. Rossi**. John Wiley and Sons, Inc. ISBN13: 978-0-470-14764-1 ISBN10: 0470147644

Prerequisites:*Bioengineering student and a previous statistics course is recommended

Course Overview: STAT 514 is an introductory course to applied statistics emphasizing the implementation in biological data. We will primarily use the statistical software R and require its use in homework and the data projects. JMP will also be explored time permitting. No previous knowledge of programming is required. The course will go through different aspects of a good statistical analysis including exploratory analysis and summary statistics, inference and hypothesis testing, experimental design, and presentation of results. Lectures will be divided between theory and applications with R, so laptops are encouraged to follow along. The course will focus more on the implementation of these topics and when to use them in order to create a competent analysis that supports the data. Homework will test knowledge of individual topics (emphasizing the use of R) and data projects will allow students to practice working with data and writing up results. The course emphasizes good practice of statistics and methods for dealing with real data.

Grading Distribution:

Homework	55%
Projects	40%
Participation	5%

Homework: Homework will be assigned approximately every 2-3 weeks throughout the semester and will be weighted equally. Problems will primarily be assigned from the book. The goal of homework is to test knowledge of statistical concepts and show the application to real data. Students are allowed to work in groups of up to 3, but must submit their own work with names of the other two students included on it. Discussion is allowed between groups if problems come up, but this should not mean groups are working together.

Data Projects: 2-3 data projects will also be assigned which should be more involved than the weekly homework, notably in that each will require a formal writeup alongside the coding. The goal of the data project is to work on presenting analyses and results properly. Each student can work in groups of up to 3 if he/she desires for the entire project. The final result should consist of a paper with the R Code in the appendix. No work is allowed between groups.

*We review some concepts from a STAT 280 level with emphasis on application and implementation.

Participation: 5% of the grade will be participation/attendance which will be loosely defined as showing up to a majority of classes and/or contributing to discussion and your own knowledge. This includes showing up to office hours or asking questions to the TA or professor over e-mail.

Academic Honesty: Please refer to the official Rice Honor Code. Since there are no exams in this course, students are always welcome to use online and text resources that help in their understanding of a topic, notably with R. Homework and data projects are group projects, and work should not be shared between groups.

Getting Help: Two TA's are assigned to help with the course. They will each hold 2 office hours, and can be used for help with any of the class material or R. Names and e-mails will be posted on OwlSpace. The instructor and TA's can also be e-mailed.

Disability Statement: Any student with a disability requiring accommodation in this course is encouraged to contact me during office hours or via e-mail. Additionally, students will also need to contact Disability Support Services.

Course Calendar: This is an estimate of what to expect, but is subject to change. We may slow down and emphasize certain details, or take time to discuss applications in R when necessary.

1/12	Introduction / Chp. 1
1/14	Introduction to R (part 1)
1/20	MLK, Jr. Day (no class)
1/21	Introduction to R (part 2)
1/26	Chp. 2
1/28	Chp. 2/3
2/2	Chp. 4
2/4	Chp. 5
2/9	Chp. 5/6
2/11	Chp. 7
2/16	Chp. 7/small sample tests
2/18	Chp 8.1-8.4
2/23	Chp. 8.4-8.7
2/25	Chp. 9.1-9.3
3/2	Spring Recess (no class)
3/4	Spring Recess (no class)
3/9	Chp. 9.4
3/11	Chp. 9.5-9.6
3/16	Chp. 9.7-9.8
3/18	Chp. 9.9
3/23	Chp. 10
3/25	Chp. 10
3/30	Chp. 10
4/1	Chp. 11
4/6	Chp. 11
4/8	Chp. 12
4/13	Chp. 12
4/15	Chp. 12
4/20	Chp. 12
4/22	Additional Topics
4/25 - 4/28	Study Days
5/6	Final day of exams

